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Spores Setting of *Gracilaria gigas* (Rhodophyta ,Gracilariales) in Different Artificial Substrates

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Abstrak

Keberhasilan penempelan spora pada subtrat tergantung dari kekasaran permukaan subtrat. Tujuan dari penelitian ini adalah untuk mencari artifisial subtrat untuk penempelan spora hingga tumbuh menjadi thallus. Rancangan acak lengkap dengan 4 perlakuan (tali rafia, tali nilon, tali ijuk dan tali kapas) denga 9 ulangan digunakan dalam penelitian ini. Pertumbuhan thallus paling cepat setah 2 minggu setelah direndam dalam akuarium dan penempelan terbanyak pada tali rafia dan paling rendah pada tali kapas dan ijuk, dengan perbedaan yang sangta nyata ($p<0.001$).

Kata Kunci : *Gracilaria gigas*, spora, subtrat, tali rafia

Abstract

The successful of spores settlement on the surface depend on the material and roughed of the surface. The aim of the present study was to find out artificial substrates as spores sticking to be thallus. Randomised design with 4 treatment (raffia line, nylon line, palm line and cotton line) and 9 replicate was used in this study. The highest thallus of G. gigas after grow after 2 moths rearing in the aquarium with the greatest number of thallus which stick on raffia line and the lowest stick on cotton and palm line. The effect of different artificial substrates showed was different significantly ($p<0.001$).

Key Words :*Gracilaria gigas*, spores, subtrate, raffia line

Introduction

The demand of seaweed in international market tends to increase every year. This trend leads to over harvesting if it is not followed by seaweed cultivation or replantation (Santelices and Doty, 1989). The observation done in Bondo water, one of seaweed production area in Jepara, in 1994 *Gracilaria sp* were very abundance (Susilo, 1986), unfortunately the *Gracilaria* was harvested along the seasons the local peoples. In the following harvesting season, the stock of some species was disappeared, in the harvesting season of 1997 - 1998, it's difficult to find *Gracilaria* in Bondo waters (Suryono, 1999). Disappear of Gracilaria stock in such waters is an example of unsustainable utilisation of natural resources.

Furthermore the situation was become worst because the coral as subtrate of Gracilaria to stick was taken for construction purposes.

Basically the natural reproduction of seaweeds are release the spore, i.e. tetraspores and carpospores. Tetraspores is haploid and will develop to be sexual generation as male and female vegetation (Suryono and Susilo, 1997). Fertilisation occur in female vegetation in carpogonium. This structure will develop become sistocarp where carpospore is released. The successful of spores to be thallus depend of the succeed it is settlement in the suitable substrates (Lobban and Harrison, 1994). Based on

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this information, the aim of the present study was to find out artificial substrates as spores sticking to be thallus.

Materials and Methods

Plants of *G. gigas* for experiments were collected from Lombok Island, West Nusatenggara. Before use the seaweeds were cleaned using marine water to remove all organisms which attached. After that they were acclimatised in the container at salinity 20 ppt in 4 days. The culture medium used was marine water from marine station Jepara and diluted with tap water until 20 ppt in salinity.

In this study, GOMPU (Gracilarian Out Planting Material Units) method of hatchery type was used (Doty and Fisher,1987). The treatment of experiments (4 treatments and 9 replicated) were artificial substrates (raffia line, nylon line, palm line and cotton line), which will be placed in the wooden frame of 40 x 30 cm. The frame, then placed in the bottom of the aquarium. The thallus of seaweed, with cystrocraps will be hung 10 cm above the water media. Data of young thallus were collected and counted after two moths, which attachment in artificial substrates in 1 cm square. Data of young thallus *G. gigas* was analised by anova (Zar, 1996).

Results and Discussions

The results given in Figure 1, indicate that the different artificial substrate treatment showed different number of thallus. From that figure we can see in which substrate *G. gigas* is able to grow (in number) best. The growth of *G. gigas* was many in raffia line and very rare in palm and cotton line substrate. The statistical test of, number of thallus in different substrates was significantly different ($p < 0.001$).

Many research of germination until to be juvenile (young thallus) of seaweed under laboratory condition has done by foreign researcher but unfortunately not many information they are using Gracilaria as object. Similar studies concentrated more in temperate species.

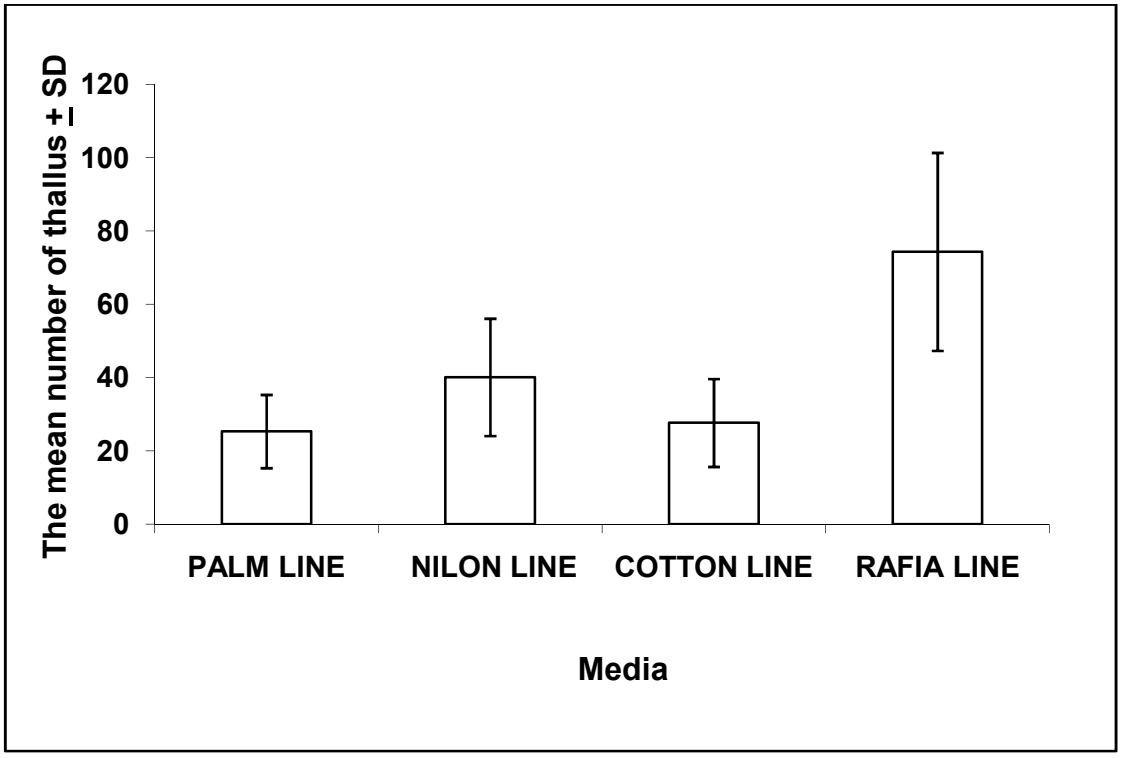

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Figure 1. The means number of Thallus ± SD in different media substrates

Once the reproductive cells have been released from the parent generation, they must get to a surface and stick on it (Lobban and Harrison, 1994). Some cells, such as zooids of green and brown algae, have a limid ability to swim. Others, such as red algal spores, green and brown algal aplano spores are nonmotile. All these structure are small enough to occupy he slow moving and non moving layer of water that form against submerged objects (Lobban and Hariison, 1994). Estimating of thickness of such a nonmoving layer, whre red algal spores sizes, for instance are 15 – 120 μm (Coon *et al*., 1972).

Nonmotile cells get to the seabed by strictly /physical forces (Coon et al., 1972). Gravity tends to pull cells downward at ever increasing speeds. The terminal velocity depends partly on the density and radius of the spore (Coon et al, 1972). *G. gigas* one of red algal which growth in tropical area may be has similar characteristics with nonmotile spores, has discussed above. Surfaces properties greatly affect settlement success, whether cells are motile or not, These properties include roughness and surface energy. Clean glass slides are unnatural surfaces, to which macroalgal cells do not adhere well, in contrast natural surfaces usually are rough (Lobban and Harrison, 1994). It is the reason why spores of *G. gigas* very difficult to settle in artificial subtrates which used in the experiment, only part oh them like raffia and nylon line are better. Further more (Doty and Fisher, 1987) informed that various plastic line materials such as raffia line nylon monofilament are better to be material collecting the spores of Gracilaria in the hatchery method and the raffia line was found to be the most satisfactory.

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